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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/020,987	12/19/2001	Tetsushi Tsukamoto	0171-0807P-SP	1165

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EXAMINER

ROSASCO, STEPHEN D

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 08/22/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/020,987

Applicant(s)

TSUKAMOTO ET AL.

Examiner

Stephen Rosasco

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 December 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other:

Detailed Action

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Alpay (5,230,971) or Mitsui et al. (5,955,223) or (4,720,442).

The claimed invention is directed to a photomask blank comprising a transparent substrate by which exposure light is transmitted, at least one layer of light-shielding film and at least one layer of antireflective film both on the substrate, and a seed layer disposed between the transparent substrate and the light-shielding film or the antireflective film, said seed layer being formed of a chromium material containing at least one of oxygen, nitrogen and carbon.

And wherein the blank has a surface roughness of up to 0.9 nm.

Alpay teaches that a primary source of defects in photomask blanks is the blank manufacturing process. Conventional photomask blanks include two or more different masking layers on the transparent substrate. A light blocking chrome or chrome-based layer and a chrome oxide antireflective layer are the basic masking layers. Additional layers such as further antireflective layers, etch rate enhancing layers and adhesion promoting layers are also used.

Alpay also teaches a phase-shift mask blank having a light semi-transmitting film which contains a transition metal, silicon and nitrogen as the main components on a

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transparent substrate, the light semi-transmitting film containing 5 to 70 at % of nitrogen and the light semi-transmitting film having a surface center-line average roughness of 0.1 to 10 nm Ra.

And wherein the transition metal is at least one selected from tungsten, tantalum, chromium or titanium.

Mitsui et al. teach a phase-shift mask blank having a light semi-transmitting film which contains a transition metal, silicon and nitrogen as the main components on a transparent substrate, the light semi-transmitting film containing 5 to 70 at % of nitrogen and the light semi-transmitting film having a surface center-line average roughness of 0.1 to 10 nm Ra.

Mitsui et al. also teach a process for the production of a phase-shift mask blank having a light semi-transmitting film which contains a transition metal, silicon and nitrogen as the main components on a transparent substrate, the light semi-transmitting film containing 5 to 70 at % of nitrogen and the light semi-transmitting film having a surface center-line average roughness of 0.1 to 10 nm Ra which process comprises the step of sputtering with a transition metal and silicon being as a target while introducing a gas containing a nitrogen gas and/or a nitrogen compound gas, in the substantial absence of an oxygen gas and/or an oxygen compound gas into a sputtering apparatus, to form a light semi-transmitting film which at least contains a transition metal, silicon and nitrogen.

Shinkai et al. teach a photomask blank comprising a transparent substrate and at least two layers including a masking layer and an antireflection layer, formed thereon, wherein said masking layer is a chromium masking layer containing from more than 25% to not more than 50% by atomic ratio of nitrogen, and said antireflection layer is a

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chromium oxide antireflection layer containing from more than 25% to not more than 40% by atomic ratio of nitrogen.

And wherein the chromium masking layer contains boron or carbon.

And wherein the under layer has a thickness of from 50 to 300 ANG.

And wherein the antireflection layer is formed on the transparent substrate and beneath the chromium masking layer, and another antireflection layer is formed on the chromium masking layer.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Rosasco whose telephone number is (703) 308-4402.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0661. Fax (703) 872-9310 Before Finals; 872-9311 After Finals.

A handwritten signature in black ink, appearing to read 'S. Rosasco', with a stylized, elongated 'S' and a cursive 'Rosasco'.

S. Rosasco
Primary Examiner
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S. Rosasco
8/15/03